1.1 RISK ASSESSMENT RESULTS

This risk assessment evaluated potential exposures of targeted populations to chemicals detected in soil beneath existing buildings, surface water, sediment, and groundwater at the site. Risks and hazards were characterized for a series of targeted population types: residents, industrial/commercial workers, outdoor workers, construction and utility workers, recreationalists, and trespassers. Objectives of the risk assessment were to evaluate whether site-related chemicals present unacceptable risks and hazards to current and possible future populations, and to provide information to support decisions regarding future land use.

EPA has developed a risk range based on potential development of cancer over a lifetime. The bottom of the range is 1 death in a million or 1 divided by 1,000,000, which is 0.000001. In scientific notation, the number is 1E-06. The upper part of the range is 1 in 10,000 or 1E-04. When a risk exceeds 1E-04, it must be managed or removed; when risk is between 1E-04 and 1E-06, management of it may or may not be necessary; when below 1E-06, risk is low enough to be considered safe.

Regarding (noncancerous) hazards, chemicals may cause serious problems to human health, such as liver or kidney problems. By use of equations developed by EPA, and with knowledge of chemicals present and likely types of exposures, hazards can be added up. If the total of hazards—called the Hazard Index—exceeds 1, a threat to health is posed that may have to be addressed; when below 1, the threat to health is low enough to be considered safe.

This risk assessment did not identify unacceptable risks (i.e., > 1E-04) to target populations from chemicals in site soils or surface water; however, risks from TCE and vinyl chloride in groundwater and aldrin and dieldrin in sediment exceeded EPA's risk range. The following summary and conclusions are based on information presented in the Human Health Risk Assessment Addendum (Appendix B).

- **Future Residents:** Total cancerous risk to future residents was 1 in 1,000 (1E-03), above EPA's risk range of 1E-06 to 1E-04. Cancer risk was driven by groundwater used for domestic purposes and inhalation of indoor air from vapor intrusion. Chemicals of concern are TCE and vinyl chloride. Total hazards for future residents exceeded 1 because of TCE in groundwater. Processes to remove/lower concentrations of TCE and vinyl chloride in groundwater are currently occurring at the site. The original risk assessment identified unacceptable risks associated with exposure to site soils, which contain aldrin, dieldrin, chlordane, and heptachlor. The unacceptable risks from site soils were addressed through the implementation of an asphalt cap. This risk assessment identified risks to future residents from dioxins, DDT (a pesticide), chloroform and TCE in site soils at the mid-point of EPA's risk range—approximately 9E-06 to 1E-05.

- **Future Industrial/Commercial Workers:** Total risk to future workers was 1 in 10,000 (1E-04), within EPA's risk range of 1E-06 to 1E-04. Cancer risk was driven by groundwater used for domestic purposes and inhalation of indoor air from vapor intrusion. Chemicals of concern are TCE and vinyl chloride. Total hazards for future workers exceeded 1 because of TCE in groundwater. Processes to remove/lower concentrations of TCE and vinyl chloride in groundwater are currently occurring at the site. The original risk assessment identified unacceptable risks associated with exposure to site soils, which contain aldrin, dieldrin, chlordane, and heptachlor. The unacceptable risks from site soils were addressed through the implementation of an asphalt cap. This risk assessment identified risks to future workers from site soils from 1E-06 to 2E-06, which is within EPA's risk range.

- **Outdoor Workers:** Total risk to outdoor workers was 2 in a million (2E-06), within EPA's risk range of 1E-06 to 1E-04. Risks were from surface and subsurface soils; however, no individual chemical had a cancer risk greater than 1E-06. Hazards were less than 1, meaning that no significant noncancerous hazards threaten human health.

- **Construction/Utility Worker:** Total risk for construction/utility workers was 1 in 100,000 (1E-05), within EPA's risk range of 1E-06 to 1E-04. Risk was due to TCE in groundwater. Total hazards for future construction/utility workers exceeded 1 because of TCE in groundwater.

- **Child Recreationalist:** Total cancer risk to recreational users, such as children playing on site, was 1 in 10,000 (1E-04). Cancer risk was primarily due to exposure to sediments in the South Pond, and to a lesser extent surface water and surface soil. Chemicals causing the risk were pesticides (aldrin and dieldrin) and dioxins. Total hazards for future recreational users exceeded 1 because of aldrin in sediment.

- **Adolescent Recreationalist:** Total risk was 4 in 100,000 (4E-05), within EPA's risk range of 1E-06 to 1E-04, but above the midpoint (1E-05) used for cleanup. Risks were due to dieldrin in surface water and aldrin and dieldrin in sediments. Hazards were less than 1, meaning that no significant noncancerous hazards threaten human health.

- **Adult Recreationalist:** Total risk was 3 in a 100,000 (3E-05), within EPA's risk range of 1E-06 to 1E-04, but above the midpoint (1E-05) used for cleanup. Risks were due to dieldrin in surface water and aldrin and dieldrin in sediments. Hazards were less than 1, meaning that no significant noncancerous hazards threaten human health.

- **Adolescent Trespasser:** Total risk was 2 in 100,000 (2E-05), within EPA's risk range of 1E-06 to 1E-04, but above the midpoint (1E-05) used for cleanup. Risks were due to dieldrin in surface water and aldrin and dieldrin in sediments. Hazards were less than 1, meaning that no significant noncancerous hazards threaten human health.

- **Adult Trespasser**: Total risk was 5 in 100,000 (5E-05), within EPA's risk range of 1E-06 to 1E-04, but above the midpoint (1E-05) used for cleanup. Risks were due to dieldrin in surface water and aldrin and dieldrin in sediments. Hazards were less than 1, meaning that no significant noncancer hazards threaten human health.